REMARKS

The courteous telephone interview granted applicants' undersigned attorney by Examiner Langel on November 20, 2003 is appreciated.

Claims 1-42 are pending in the application.

Claims 1-32 are allowed.

Applicants request reconsideration of the rejection of claims 33-39 under 35 U.S.C. §103(a) based on U.S. Patent No. 4,088,743 (Hass et al.) in view of pages 17, 25 and 26 of Fuel Flue Gases: The Application and Interpretation of Gas Analysis and Tests, American Gas Association, edited by C. George Segeler (1940) ("Fuel Flue Gases") and of claims 33-42 based on Hass et al. and Fuel Flue Gases in further view of pages 18-84 to 18-90 in the Chemical Engineer's Handbook (Fifth Edition) by Perry et al.

Independent claim 33 is directed to a process for the production of elemental sulfur from an acid gas feed stream containing hydrogen sulfide and an unsaturated hydrocarbon component selected from the group consisting of linear olefins, branched olefins, aromatic hydrocarbons and mixtures thereof. The hydrogen sulfide is oxidized to elemental sulfur in a catalytic reaction zone containing an oxidation catalyst and supplied with an oxidant gas. The acid gas feed stream is pretreated upstream of the catalytic reaction zone to reduce the concentration of the unsaturated hydrocarbon component and inhibit deactivation of the catalyst by contacting at least a portion of the acid gas feed stream with an aqueous acid wash to react unsaturated hydrocarbons with the acid and form an addition reaction product and then separating the addition reaction product from the acid gas feed stream.

As discussed with Examiner Langel during the above-referenced telephone interview, the Office action misconstrues the teaching in Example XII and corresponding Fig. 2 of the

primary reference, Hass et al., such that the rejection under 35 U.S.C. §103(a) should not be maintained.

Hass et al. disclose a process which includes the selective catalytic incineration of hydrogen sulfide (H_2S) in a feed gas with oxygen to produce sulfur dioxide (SO_2) in accordance with Reaction Equation (I) and carried out in a catalytic incinerator (11). Hass et al. discloses a variety of H_2S-containing feed gases, including discharge from petroleum refineries, sewage plants, meat packing plants, geothermal power plants, soap factories and chemical manufacturing plants as well as sour natural gases and sour refinery gases (See col. 2, lines 45-52). In instances where the incoming feed gas contains more than about 400 ppmv of H_2S, Hass et al. teach that it may be desirable prior to selective catalytic incineration to catalytically oxidize a portion of the H_2S with oxygen directly to elemental sulfur in accordance with Reaction Equation (IV). This is achieved by directing all or a portion of the feed gas 1 in Fig. 1 to catalytic oxidation reactor (25) along with an oxygen-containing gas (See Example 1, line 51, et seq.).

In Example XII, Hass et al. disclose **"a specific embodiment of the invention"** in which the H_2S in the vent gases emanating from geothermal power plants is incinerated in accordance with the disclosed invention. As shown in Fig. 2, **geothermal steam** is sent to a turbine (60) and the exhausted steam/H_2S-containing vent gases are passed to a contact condenser (80) where the gases are condensed by contact with cooling water. The resulting liquid mixture (i.e., cooling water and steam condensate) is sent to a cooling tower (130) and recirculated to the condenser. A portion of the H_2S and other non-condensable components of the vent gases is withdrawn from the condenser and fed to the disclosed process to effect ultimate catalytic incineration of the H_2S contained in these gases (See col. 15, line 55 to col. 16, line 40). Preferably, purified off-gases from catalytic

incinerator (11) are sent via line (170) to a conventional SO_2 scrubber wherein SO_2 is dissolved in an aqueous solvent and the remaining purified gases are sent to the atmosphere. A preferred aqueous SO_2 absorbing medium is cooling water from cooling tower (130) and a portion of the resulting scrubber waste water is preferably recirculated back to the cooling tower to maintain the cooling water in the desired pH of about 5.5-7.5 (See col. 16, lines 42-67).

Hass et al. do not disclose treatment of the incoming feed gas to remove an unsaturated hydrocarbon component by contacting the feed gas with an aqueous acid wash as required in claim 32. Nevertheless, at the bottom of page 3 of the Office action, the Office contends that such contact and removal of unsaturated hydrocarbons is equivalent to operation of contact condenser (80) wherein cooling water commingled with acidic waste water from SO_2 scrubber (180) contacts the geothermal steam vent gases emanating from the turbine (60). However, as acknowledged on page 4 of the Office action, unlike the acid gas feed stream called for in claim 33, the geothermal steam vent gases described in Example XII of the primary reference do not contain an unsaturated hydrocarbon component (See, for example, col. 15, lines 58-60 of Hass et al.). In the paragraph bridging pages 4 and 5 of the Office action, it is the Office's further position that one of skilled in the art would have used the "specific embodiment of the invention" as shown in Fig. 2 and described in Example XII of Hass et al. for geothermal steam vent gases to treat other H_2S-containing feed gases disclosed in the reference, including sour natural gases and sour refinery gases, that may contain such an unsaturated hydrocarbon component.

The Office's rationale underlying the rejection impermissibly ignores the express teaching of the primary reference. More particularly, applicants respectfully submit that nothing in the primary reference or other prior art of

record would motivate one skilled in the art to not only substitute other H_2S-containing feed gases disclosed by Hass et al. for geothermal steam vent gases, but to also continue to practice the process as described in Example 12 for geothermal steam vent gases.

First, as would be understood by those skilled in the art, the disclosure in Fig. 2 and Example XII of contacting H_2S-containing **geothermal steam** exhausted from a power plant with cooling water in a contact condenser is unique to processes in which the H_2S-containing feed gas comprises steam. This practice is to condense and remove the sizable water vapor load in exhausted geothermal steam and render more practical the subsequent catalytic incineration of the H_2S contained in the remaining non-condensable gases. Thus, despite the mention in the primary reference of a variety of other H_2S-containing feed gases, including sour natural gases and sour refinery gases, one skilled in the art would recognize that the process shown in Fig. 2 and described in Example XII as "a specific embodiment of the invention" is adapted to treatment of H_2S-containing geothermal steam wherein a contact condenser is used to reduce the considerable water vapor load prior to the catalytic incineration treatment. There is no teaching in the primary reference (nor any conceivable practical reason for that matter) which would motivate one skilled in the art to use the process as shown in Fig. 2 to treat sour natural gases, sour refinery gases or any other H_2S-containing feed streams not in the form of steam. Rather, one skilled in the art would identify the process as shown in Fig. 1 of Hass et al., which does not include a steam condensing step, as being applicable to treat such other H_2S-containing feed streams. In Example I of Hass et al., the

embodiment shown in Fig. 1 was used to treat a hydrogenated Claus tail gas.[1]

Secondly, and as emphasized with Examiner Langel in the telephone interview, Hass et al. teach that the purpose of the disclosed preference of diverting a portion of the acidic SO_2 scrubber waste water into the cooling water circulating through cooling tower (130) and contact condenser (80) is **to counteract the tendency of ammonia normally present in geothermal steam** to increase the pH of the cooling water to above 7.5 which may lead to scaling problems (See col. 16, lines 42-67). Thus, even if for some reason one were to substitute other H_2S-containing feed gases for geothermal steam vent gases in the process of Example XII of Hass et al., one skilled in the art would have no reason to divert a portion of the acidic SO_2 scrubber waste water into the cooling water circulating through the contact condenser (80). The Office action utterly fails to explain why one skilled in the art making such a substitution of feed gases in Example XII of Hass et al. would nevertheless continue the practice of diverting acidic waste water from the SO_2 scrubber into the circulating cooling water in the absence of the basifying effect of ammonia said to be present in the geothermal steam vent gases.

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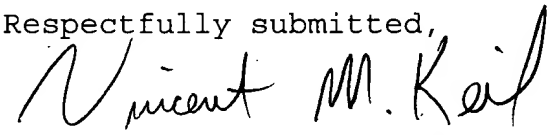
[1] On page 9 of the Office action, under paragraph (c), Examiner Vanoy attempts to rebut this aspect of applicants' argument by asserting that "[t]here is nothing in either figure 2 or the description of figure 2 requiring that only water be condensed out of the sour gas being treated." Examiner Vanoy misses the point. It is not that condensable components other than steam might be condensed in the contact condenser, it is that the clear purpose of the contact condenser in Hass et al. is to condense the exhausted **steam** (See col. 15, lines 61-62) not other condensable components that may or may not be present. Furthermore, the "conspicuous absence" of water/steam from the compositions of the sour feed gases in Tables I, II, III, IV and V noted by Examiner Vanoy is explained by the fact that these are reported by Hass et al. as **"dry"** compositions (See col. 9, line 39; col. 10, lines 2 and 41; col. 13, line 19; and col. 14, line 31).

The shortcomings of the primary reference cannot be overcome by resort to either Fuel Flue Gases or the Chemical Engineer's Handbook.

Accordingly, in view of the above, applicants respectfully submit that the references cited in the Office action fail to establish a *prima facie* case of obviousness with respect to the invention defined in independent claim 33. Dependent claims 34-42 which depend from claim 33 are likewise submitted as patentable over the cited art.

Favorable reconsideration and allowance of all pending claims are respectfully solicited. In order expedite allowance of this application, the Examiner is invited to contact the undersigned attorney to discuss any remaining issues.

Respectfully submitted,



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